the editor that the *Journal of Botany* will be continued, the support during the past year having been sufficient to leave a balance on the right side of the account.——In the October number of the *Torrey Bulletin*, Dr. Allen publishes some very interesting notes on the American species of Fortpella, with six plates of figures. A key to all the known species (12) is given, and four new species and a new variety are described. Eight species are found in North America, and these are widely enough distributed to warrant a search for them in any part of the country with a reasonable hope of success.——In the same number D. H. Campbell figures and describes some very simple prothallia of a fern *(Onoclea struthiopteris)*. A row of four or five cells terminate in an apparently single celled antheridium! They were obtained by artificial culture under glass.——Robert Ridgway, in the December *Botanical Gazette* records a number of true measurements, which confirm the belief we have held for many years that the heights of our trees as given in the books and manuals are uniformly too low; witness the following: *Quercus michauxii*, 119 feet; *Carya porcina*, 115 feet; *C. microcarpa*, 134 feet; *Catalpa speciosa*, 101½ feet; *Fraxinus americana*, 127 feet; *Sassafras officinale*, 82 feet.——After a long delay, no doubt very vexatious to the author, the botanical portion of the thirty-third and thirty-fourth Annual Reports of the New York State Museum of Natural History have appeared. The first was transmitted to the legislature in February, 1880, and the last in March, 1881. Surely the State of New York ought not to delay so inexcusably the publication of such important reports. Both contain numerous descriptions of new species, and in each are good plates giving details of structure.

ENTOMOLOGY.[1]

FLIGHT OF INSECTS.—Dr. Amans in his extended paper describes his examination of the structure of the thorax in Æschna, Sirex and Locusta, and discusses the views of previous authors on the subject of flight of insects. He considers that a rational theory of flight can only be formulated after various dissections and numerous experiments on the resistance of the air; the laws of the latter are as yet very incompletely known, and as to anatomy, a knowledge of one animal hardly affords a sufficient basis for a general theory. For the investigation of preliminary problems Æschna is specially well adapted, as it is probably the most swiftly flying of insects, making, as it does, twenty-eight vibrations a second.

ANTENNARY RODS OF VANESSA 10.—J. Chatin describes the cavities found on the joints which form the tip of the antennæ of

[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

this insect as communicating with the exterior by means of a very narrow orifice, which does not open directly to the exterior, but is more or less completely closed by cuticular ridges which approximate to and curve towards one another. Some authors, indeed, report the presence of an obturator membrane, but this is an appearance only, and seems to be due to the disposition of these parts; the rod or rods found in the pit have a peripheral zone, within which is a quantity of finely granular protoplasm; it is only in the young that one can observe the nucleus, as the rapid formation of pigment obscures the relations of this body; the bodies that have been described as nucleoli are due the granulation of the protoplasm, and the subsequent condensation of the pigment into small ovoid masses. The rod may be considered as a modified hypodermic cell of special function, and particularly characterized by the prolongations at either end; the lower of these is indicated by the nerve-branches; the upper appears to undergo a special differentiation, the exact investigation of which the author postpones for the present.—*Journal of the Royal Microscopical Society, December, 1883.*

RUDIMENTARY WINGS IN BEETLES.—Dr. H. Dewitz points out that the hind wings of the Coleoptera show most distinctly how an organ may gradually become aborted by disuse, and how a transformation of the whole habit of the animal may be connected with this. The membranous hind-wings of beetles, which serve for flight, lie, as is well known, concealed beneath the firm horny fore-wings, the so-called elytra. For the purpose of flight the elytra are raised, and the folded hind-wings extended, so as often to exceed the former in length. But many beetles do not fly at all. In these we find the hind-wings more or less aborted or entirely deficient. This phenomenon occurs with especial frequency among the Carabidæ, Melasomata and Curculionidæ, and also, although less frequently, among the Ptinidæ.

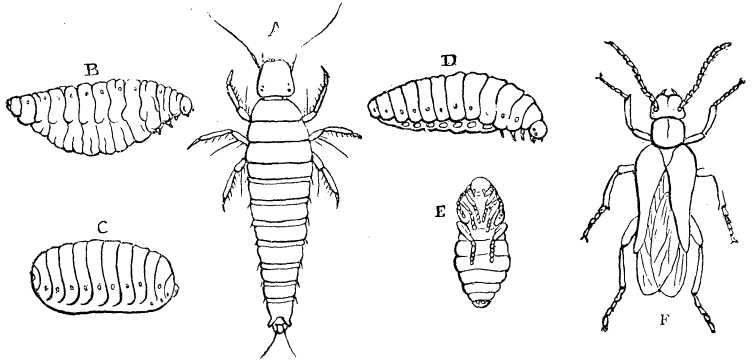
As the wings are already indicated in the larva, Dr. Dewitz was inclined to think that, in one or other of the species entirely destitute of wings, traces of these organs would occur, at least in the larval or the pupal stage. For four years his labors were in vain, and it is only quite recently that he succeeded in demonstrating the rudimentary hind-wings in the larvæ and pupæ of *Niptus hololeucus* Lam., in which both sexes are apterous, *i. e.* destitute of hind-wings. The fore-wing occurs in the half-grown larva, but the rudiment of the hind wing only shows itself much later when the animal is already on the point of terminating the larval stage.

We have in these rudiments of hind-wings an organ which is either advancing or has retrograded. That it is not an advancing organ, but one in course of disappearance, is shown most decidedly by the circumstance that this, like all retrogressive organs, does not, like those in full function, increase with the development of the individual, but, on the contrary, diminishes. We are there-

fore justified in assuming that *Niptus hololeucus* once bore well-developed hind wings, and that these gradually became aborted in consequence of disuse, until they were finally thrown back into the young stages, and some day will disappear even from these stages. In other wingless beetles this period may have already occurred.

This abortion of an organ brings after it other transformations of the body. Without the hind-wings the beetles cannot fly. It is therefore not necessary for them to be able to spread out the elytra, the latter remain permanently lying upon the back. What is the consequence? The two elytra grow together to form a firm dorsal shield, such as we find in nearly all beetles which are entirely destitute of hind-wings. At the same time the elytra become convex, and bend round at the sides, so that they embrace the abdomen. In consequence of the disappearance of the wing-muscles, the thorax becomes altered. The body acquires quite a different form; new forms are produced which we call species.

SITARIS AND ITS TRANSFORMATIONS.—Those who have read of the hypermetamorphosis of Meloë, and of Epicauta, &c., in preceding volumes of this journal, may be interested to note those of the European Meloë beetle, Sitaris, whose history was worked



Hyper-metamorphosis of Sitaris.

out by Fabre, in 1857. In the figure, *A* represents the first larva. It is hatched in the nest of bees, and when the male bees leave their holes in the spring, which they do before the females, the larvæ spring upon them, and afterwards crawl upon the females. The Sitaris larvæ devour the eggs laid by the bee, and then begin their hypermetamorphosis. The eyes disappear, and the legs and feelers become rudimentary (*B*), whilst they feed on the honey; the body and legs become short and thick, and finally a legless quiescent third stage *C;* then an active fourth one (*D*), which becomes a normal pupa *E*, the beetle being represented at *F;* all the figures being enlarged.

VARIATION IN THE ARCTIAS.—Rev. Dr. Hulst, in the Bulletin of the Brooklyn Entomological Society for October, relates how

from a single hatch of eggs of *Arctia excelsa* Neum. he reared twelve imagines in which the variation was so great as to create havoc among the species of Arctia. From his breeding Dr. Hulst now places *A. phalerata, pallida, celia, snowi, phyllira, figurata, placentia, decorata, flammea* and *excelsa* as synomyms of *A. nais* Drury, and *A. saundersii* Grote as synonymous with *A. parthenice* Kirby; *A. anna* Grote being merely a variety of the same species. Mr. Hulst is not singular in this respect. Our own rearing experience is similar and we anticipate some pretty extensive coalitions in Mr. Stretch's forthcoming monograph.

AFFINITIES OF PALÆOCAMPA.—In discussing the genealogy of the Myriopoda in a paper just issued from the Proceedings of the American Philosophical Society (Vol. XXI, p. 208) Dr. Packard concludes that Palæocampa—a caterpillar-like form described by Meek and Worthen, from the carboniferous of Illinois—is not a Myriopod as Scudder maintained, but that it may be regarded as the hairy larva of some carboniferous neuropterous insect allied to the Panorpidæ. He would therefore exclude it from any genealogical considerations in reference to the Myriopods.

THE HESSIAN FLY.[1]—During the present summer I noticed that the Hessian fly was exceedingly destructive in some part of Perry county, Penna., especially near the west bank of the Susquehanna river, whole fields there were so badly injured that the crop was not worth reaping. It is the steady belief of the farmers in the county that the attacks of this insect are not, as is frequently supposed, most severe on the early sown wheat, on the contrary, they maintain that the earliest sown wheat, namely that put in during the first week of September, often yields a good crop, while that which is sown between the 10th and 22d is badly infested and the latest, that soon in the last week of the month, again escapes. The last part is of course natural and usual. But that the earliest wheat should thus yield well is not, I think, in accordance with the customary statements on the subject.

I am inclined to think that it may be accounted for in the following way. The early sown wheat may not escape the fly but may yield, as said above, a fair crop, because it grows strong and rank, and is thus better able to support an attack. A single "flax seed" will not materially injure a showy and healthy straw. But when, as I have seen them this season, five, six and seven are found together, the stem is so weakened that it must fall. The early sown wheat, especially if thick as it usually is in Perry county, sprouts or tillers out much more than the late wheat, and may consequently thus also make up for the destruction of some of its stalks by the fly.

It is not likely that the earliest wheat is avoided by the fly, and consequently the above explanation seems rational. It is the

[1] Abstract of a paper read before the Amer. Assoc. Adv. of Science, at Minneapolis.

spring attack that does the whole mischief to the farmer who knows nothing concerning the autumn brood.

I have, moreover, been led to believe that an enormous destruction of the "flax seed" occurs during the winter, especially in the roots, which are entirely killed by the fly. I have often dug up and examined such roots during the winter and have many times found the pupæ nearly all dead and rotten. If further examination should confirm this observation we have an efficient cause checking to a great extent the excessive multiplication of this pest.

ZOÖLOGY.

NOTES ON AMERICAN MEDUSÆ.—No group of marine animals presents a more fascinating field for the discovery of unknown facts than the Medusæ. As in the progress of science isolated observations may come to have a value greatly beyond their apparent significance, I have thought it best to publish a series of disconnected notes on these animals. Many of them have been in MS. for some time, and I have preserved them in this form with the belief that new opportunities might give me such additional observations as would enhance their value. Many notes, and some of the most important, have already become antiquated through the studies of others. The remainder are presented below as a contribution to the study of the surface fauna of the ocean, to which naturalists are at present turning their attention with renewed activity.

Dinematella cavosa Fewkes.—The youngest larva of this genus known to me is represented for the first time in the accompanying cut (Fig. 1). The most important difference between it and the adult is the very small size of the apical projection of the bell. This portion of the nectocalyx barely rises above the surface in the larva, whereas in the adult it often projects to a height equal to the diameter of the bell itself. In this projection, however, even in this young condition, the curious cavity or brood sac (*c*) can be

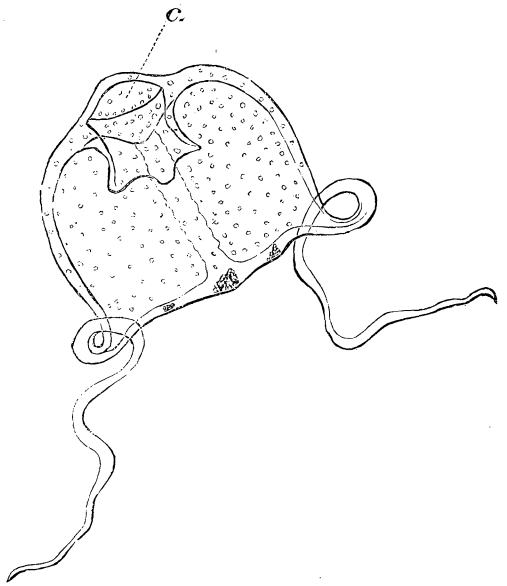


FIG. 1.—*Dinematella cavosa.*